Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

REVISION OF JAPANESE VIVIPARIDÆ, WITH NOTES ON MELANIA AND BITHYNIA.

BY HENRY A. PILSBRY.

My work on these groups has been based largely upon material supplied by Mr. Y. Hirase, of Kyoto, Japan.

VIVIPARIDÆ.

The *Viviparidæ* of Japan, so far as their appearance in the field of literature is concerned, are involved in mind-destroying chaos. This has been due partly to the intrinsic difficulty of the subject, but chiefly to a failure on the part of authors to correctly identify the older Oriental species. Mr. T. Iwakawa,[1] of Tokyo, has published a lucid essay upon the subject, in which the natural divisions or species are for the first time correctly set forth. Owing, however, to the fact that he used the names for the species given by Kobelt[2] (as there is probably no library in Japan sufficient for the verification of the German author's statements), the nomenclature adopted by Iwakawa requires revision. This implies no criticism of the Japanese naturalist's admirable essay. The source whence his nomenclature was drawn was tainted; but the names aside, his grasp of the facts of nature was sound.

Pseudo-japanese species.

In my opinion, the following species do not occur in Japan:

Paludina oxytropis Benson, Journal of the Asiatic Society of Bengal, v, 1836, p. 745, type locality Sylhet. Figured in Conchologia Indica, Pl. 76, fig. 5, and Conch. Iconica, fig. 9.
+ *P. pyramidata* v. d. Busch in Philippi, Abbildungen, etc., I, p. 113, Pl. 1, figs. 3, 4 (1844). Type locality, Bengal.

Paludina ingallsiana Lea, Proc. Acad. Nat. Sci., 1856, p. 110. Figured in Observations on the Genus Unio, etc., XI, p. 74, Pl. 22, fig. 9. Type locality, Siam. Not *P. ingallsiana* Reeve!

I am satisfied that those who will compare authentic specimens of these species, or in their absence the figures referred to above, will agree with me that no specimens referable to either of them have been made known from Japan.

---

[1] Notes on the Paludina-species of Japan, in *Annotationes Zoologicæ Japonenses*, I, Part 3, pp. 83–92, Pl. V, 1897.

[2] *Fauna Molluscorum Extramarinorum Japoniæ*, Frankfurt, 1879.

Vivipara stelmaphora Bourguignat, Rev. et Mag. de Zool., Mars, 1862, Pl. 6, figs. 7, 8; Spicil. Malac., p. 135, Pl. 10, figs. 7, 8. Type locality, Pekin, China.

While close to the Japanese *V. malleatus* (Rve.), this species differs in its comparatively longer spire and smaller aperture. It seems to me related to *V. lecythoides* (Bens.). Its introduction into the Japanese list was due to the three spiral punctured lines, which *stelmaphora* has in common with several other species.

Japanese species.

With the above-mentioned Continental species out of the way, we find the following described from Japan:

Paludina histrica Gould, 1859.
Paludina japonica v. Mart., 1860.
Paludina læta v. Mart., 1860.
Paludina malleata Reeve, 1863.
Paludina abbreviata Reeve, 1863.
Paludina nitens Reeve, 1863.
Vivipara sclateri Frauenfeld, 1865.

Of these seven names, three or four stand for species; the others being synonyms or varieties.

Viviparus malleatus (Reeve). Pl. IX, figs. 6, 7.

Paludina malleata Reeve, Conch. Icon., Vol. XIV, Pl. 5, fig. 25 (February, 1863).
Paludina abbreviata Reeve, Conch. Icon., Vol. XIV, Pl. 5, fig. 26 (February, 1863).
Paludina stelmaphora Kobelt, Fauna Moll. Extramar. Jap., p. 122, Pl. 11, fig. 4.
Paludina stelmaphora Iwakawa, Annot. Zool. Jap., I, p. 85, Pl. 5, figs. 1-4. Not *V. stelmaphora* Bgt.!

"Shell swollen, egg-shaped, thin, smooth, with a greenish epidermis; spire low with an obtuse apex usually worn out in old specimens. *Whorls quite rounded,* separated by deep sutures, each whorl wound round with *three punctured lines.*"[3] These lines bear short bristles in young or perfectly preserved adult shells. They are sometimes very faint, in part obsolete, but I believe always visible on some part of the shell. Two are on the upper surface and one near the periphery. Even when the early whorls are preserved, there are no angles or spiral ridges on the shell, such as usually occur in the next species, though specimens "often present hammered-like sculpture on the surface," hence the name *malleatus*.

---

[3] I can do no better than to quote Iwakawa's words.

Mr. Iwakawa has traced this species from the Province Mutsu, at the north end of Nippon, to the middle Riukiu Islands. Mr. Hirase sends specimens from the islands also. Fig. 6 represents a specimen from Kagoshima, Satsuma. Fig. 7 is from a very smooth and glossy shell from Okinawa.

This species is more globose than the Chinese *V. stelmaphora*, the tube enlarging more rapidly, producing a lower spire and larger aperture.

Paludina lœta v. Martens (*Malak. Blätt.*, VII, 45), described from a specimen or specimens collected by Siebold, and not figured, is a glossy form with some puncture-lines, as in the smooth form of *V. malleatus*. The type has 6 whorls, and measures alt. 23, diam. 21 mm. The last whorl is distinctly angular. I think this is likely to prove to be a form of *V. malleatus*. If so, the name has priority.

Viviparus japonicus (v. Martens). Pl. IX, fig. 1.

Paludina japonica v. Mart., Malakozoologische Blätter, VII, 1860, p. 44. Reeve, Conch. Icon., fig. 13. Kobelt, t. c., p. 120, Pl. 11, fig. 1.
Paludina oxytropis var. *japonica* Iwakawa, t. c., p. 88, Pl. 5, fig. 17.
Paludina oxytropis var. *sclateri* Iwakawa, t. c., p. 89, Pl. 5, fig. 14.

Large, pyramidal, dark olive-green and glossy. The earlier whorls are encircled by two keels, later becoming mere angles, and then usually disappearing on the last whorl or two. There may also be some oblique malleation in places. The last whorl is obscurely angular, the angle darker. There are no puncture-lines, as in *V. malleatus*, though there are fine, subobsolete spiral striæ. The specimen figured is from Omaki, Yamashiro. The type locality is not known, the specimens brought home by Siebold being merely labeled Japan.

Viviparus japonicus var. **iwakawa** nov. Pl. IX, fig. 3.

Paludina oxytropis Bens., Kobelt, t. c., p. 123, Pl. 11, figs. 6, 6*a*, (exclusive of synonymy).
P. oxytropis Bens., Iwakawa, t. c., p. 88, Pl. 5, figs. 12, 13. Not *Paludina oxytropis* Benson, an Indian species belonging to an appreciably different group !

Differing from *V. japonicus* chiefly in the persistence in adult shells of the keel at the periphery, giving the shell "the shape of a double cone,'' and the greater prominence of several spiral cords or angles above and below. Iwakawa has abundantly proven that this form intergrades perfectly with the typical *V. japonicus*—a fact manifest in the series before me. He holds also that it intergrades with the form called '' *P. sclateri* '' by Kobelt, but which is far from being the typical *V. sclateri* of Frauenfeld. He also gives reasons for believing that this carinate form '' represents the ancestral species whence the several varieties have arisen.'' It seems to be confined to the northern third of Nippon, so far as existing data show. Types of var. *iwakawa* are from Furukawa, Rikuzen, No. 80,639 Coll. A. N. S., from No. 61 of Mr. Hirase's collection.

I have not yet seen specimens of the form called *sclateri* by Iwakawa. It occurs in the same area as var. *iwakawa,* and so far as we know not in southern Nippon, where the true *V. sclateri* and where Kobelt's *sclateri* live.

Viviparus histricus (Gould). Pl. IX, fig. 5.

Paludina histrica Gld., Proc. Boston Soc. N. H., VII, p. 41 (June, 1859); Otia Conch., p. 106.
? *Paludina nitens* Reeve, Conch. Icon., fig. 59 (April, 1863).

The shell is umbilicate, pyramidal, brownish-green, and glossy when clean. There are no puncture-lines, though faint spiral striæ exist. The whorls are carinate at the periphery, the keel usually projecting above the sutures, but reduced to a mere low cord on the last whorl. A well-grown specimen measures, alt. 31, diam. 21 mm. Figured specimen is from Kagoshima, Satsuma.

Viviparus sclateri Frauenfeld. Pl. IX, fig. 4.

V. sclateri Ffld., Verh. zool.-bot. Ges. Wien, XV, 1865, p. 531, Pl. 22, upper figures on left side.
? *Paludina ingallsianus* Reeve, Conch. Icon., XIV, Pl. 7, fig. 39 *a, b* (1863).
P. ingallsiana Reeve, Kobelt, t. c., p. 124, Pl. 10, fig. 14–18; Pl. 11, fig. 2.
P. ingallsiana Reeve, Iwakawa, t. c., p. 86, Pl. 5, figs. 5–7 (not typical).
? *P. sclateri* Kobelt, t. c., p. 121, Pl. 11, fig. 3.
Not *P. ingallsiana* Lea, 1856!

A pyramidal, brownish species, with strongly angular periphery and several low angles above it. The shell attains a large size, the specimen figured measuring alt. 45, diam. 30 mm., though eroded above.

V. sclateri is, perhaps, a variety of *V. histricus,* but as I have not seen specimens connecting them, I allow it to stand here as a species, pending fuller information.

So far as we now know, its area of distribution does not overlap that of the carinated form of *V. japonicus.* Mr. Iwakawa writes: "This excellent species has hitherto been known only from Lake Biwa, to which I will now add two more localities: Lake Suwa in Prov. Shinano, and Nagoya in Prov. Owari, on the strength of specimens contained in the Imperial Museum." "In the north-eastern provinces of Hondo I could not obtain a single specimen of this species, in spite of my efforts to collect during the excursion of last summer. It is very desirable to ascertain its range of distribution in middle Japan and also in the southwestern provinces, where it probably also occurs."

Paludina sclateri of Kobelt's *Fauna* seems to be an ecarinate form of this species. It is far from being typical *sclateri.*

MELANIIDÆ.

Melania reiniana var. **hidachiensis** nov. Pl. IX, fig. 2.

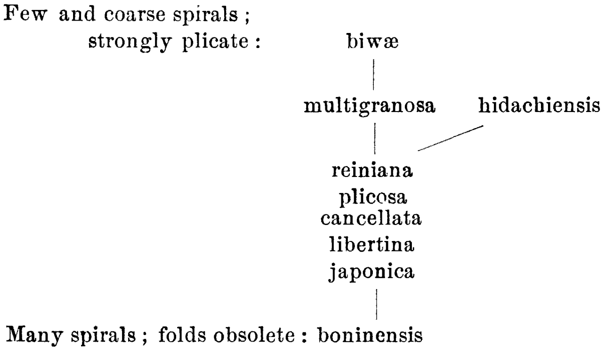
Shell moderately slender, greenish-yellow above, the last whorl olive-brown under a blackish incrustation. *Whorls strongly convex,* sculptured with strong, slightly curved ribs, rather wide-spaced, 11 or 12 on the penultimate whorl, those on the last whorl becoming smaller and closer, not extending below the periphery; the whole surface sculptured with spiral liræ, about 15 on the last whorl, those below the periphery continuous, those above more or less obsolete between the longitudinal ribs, conspicuous upon them.

Length 23, diam. 9, length of aperture 8½ mm.; 6 whorls remaining.

Length 20, diam. 9, length of aperture 9½ mm.; 4½ whorls remaining.

Manabe, Prov. Hidachi (Mr. Y. Hirase). Types No. 80,680 Coll. A. N. S., from No. 145 of Mr. Hirase's collection.

This form has quite convex whorls, while they are flat in *M. multigranosa.* The ribs are strong, especially above, as in a strongly marked *Goniobasis plicifera,* and the spirals of the base are numerous and equal. *M. multigranosa* Bttg. is a species closely related to *M. niponica* Smith, and like that, known only from the neighborhood of Lake Biwa, while the present form is from Hidachi province, on the east coast northward from Tokyo Bay. It is far more strongly sculptured than *M. reiniana,* which is clearly only an extreme form of *M. libertina.* The somewhat complex relationships of this group of species may be roughly expressed in a diagram, thus:



M. hidachiensis is thus to be regarded as a modification of the *libertina* stock parallel to *multigranosa*, without direct genetic connection with the latter. *M. libertina* var. *plicosa* is a central or intermediate form, whence modification in the direction of stronger folds and in the opposite direction of weaker and then complete loss of folds has taken place.

Melania libertina var. **latifusus** nov. Pl. IX, fig. 8.

Shell wide, with comparatively short, conic spire and produced base; evenly striated throughout or with the middle smoother, without a trace of longitudinal folds; olive or brown.

Length 33, diam. 15, length of aperture 17 mm.

Mino, Settsu (Mr. Y. Hirase).

The forms *tenuisulcata* and *ambidextra* are simply variations in development of the spirals, and not of racial import. In American Melanians we now recognize that the same species is frequently dimorphic, having a smooth and a spirally striate form existing together in one locality, usually with all possible intervening forms. The same is unquestionably true of this Japanese species. In the varieties *decussata* and *plicosa* longitudinal folds appear, and lead the way to *M. reiniana* Brot, which is strongly plicate like *Goniobasis plicifera* of our West, with close spirals. Gould's description of *M. libertina* applies especially to the forms with spirals but without folds, though some of the original specimens now before me have the folds of "*plicosa.*" Neither of the localities "Simoda and Ousima" given by Gould are in China, as Brot and Kobelt suppose.

Simoda (or Shimoda) is at the southern end of the Izu peninsula and " Ousima " is Oshima, a large island northeast of Okinawa, in the " Riukiu Curve." There is also an Oshima (Izu-no-Oshima) at the mouth of the Sagami Sea, one of the " Seven Islands of Izu." The name, meaning " big island," is somewhat common in Japan. *M. retifera* Tryon is a rather small form of *libertina*, with somewhat coarse spirals but no folds. *M. hakodadiensis* Hartman is normal *libertina* with even and rather fine spirals. The types of both are before me. *M. boninensis* Lea, of which two of the original lot, given by Lea, and several collected by Mr. S. Yoshiwara, lie before me, is a dwarfed island form of the *libertina* stock, distinct by its small size and somewhat attenuated contour. It has erroneously been referred to a separate section of the genus by some authors.

AMNICOLIDÆ.

Bithynia striatula var. **japonica** Pilsbry. Pl. IX, figs. 9, 10, 11, 12.

These *Proceedings* for 1901, p. 405.

Figs. 9, 10, 11 are from specimens of the type lot, from Manabe, Hidachi. Fig. 12 is the smoothest specimen of a series from Osaka.

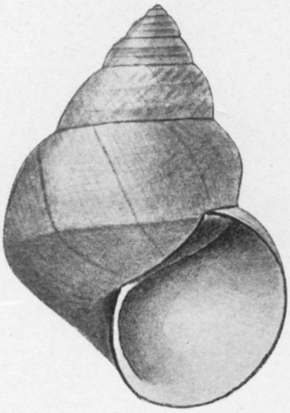
The operculum has a distinctly spiral nucleus in this species. This feature has twice been made the basis of generic distinction, but I prefer to retain the species in *Bithynia* until a thorough study can be made of the opercula of the group. Probably several stocks have independently changed from the spiral to the concentric type.[4]

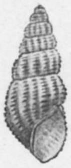
EXPLANATION OF PLATE IX

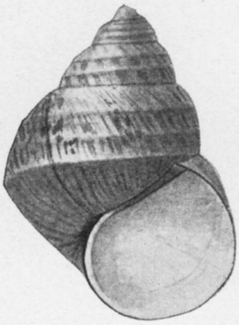
Fig. 1.—*Viviparus japonicus* v. Mart. Omaki, Yamashiro.
Fig. 2.—*Melania hidachiensis* Pils. Manabe, Hidachi.
Fig. 3.—*Viviparus japonicus* var. *Iwakawa* Pils. Furukawa, Rikuzen.
Fig. 4.—*Viviparus sclateri* Ffld. Near Kyoto.
Fig. 5.—*Viviparus histricus* Gld. Kagoshima, Satsuma.
Fig. 6.—*Viviparus malleatus* Rve. Kagoshima, Satsuma.
Fig. 7.—*Viviparus malleatus* Rve. Okinawa, Riukiu Islands.
Fig. 8.—*Melania libertina* var. *latifusus* Pils. Mino, Settsu.
Figs. 9, 10, 11.—*Bithynia striatula* var. *japonica* Pils. Manabe, Hidachi.
Fig. 12.—*Bithynia striatula* var. *japonica* Pils. Osaka.

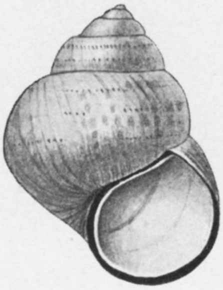
---

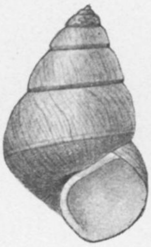
[4] Dr. O. von Möllendorff has referred *B. striatula* to the genus *Fossarulus* Neumayr, and has discussed the status of Père Heude's Chinese species in a paper which came to hand since the above was written. *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St. Pétersbourg*, VI, 1901, Binnen-mollusken aus West-china und Central-asien, p. 101 (1902).

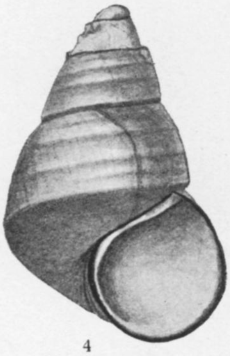

1

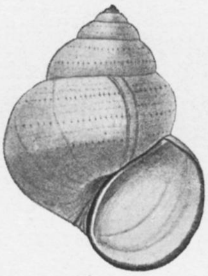

2

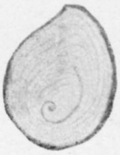

3

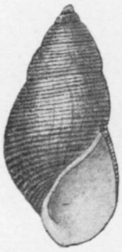

6

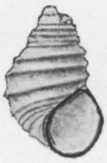

5

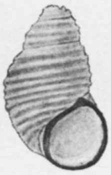

4

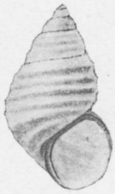

7


11


8


9


10


12

PILSBRY. MOLLUSKS OF JAPAN AND THE BONIN ISLANDS.